What is claimed is:

1. A flexible respiring polymeric film with a spatially ordered structure of capillary pores of selectable diameter and funnel-shaped expansions in at least one surface for enabling the exchange of gas through the polymeric film and a composite layer structure of at least one transparent binder layer of chemically inert inorganic nanoparticles for protecting the polymeric film and at least one lining film adhering to the binder layer and made from hydrophilic non-toxic metal oxide nano-articles which under short wave light irradiation are photocatalytically active which are anti-bacterially and self-clean singly effective, with their effectiveness being adjustable by the selection of the opening angle of the funnel-shaped expansions of the capillary pores.

2. The flexible respiring polymeric film according to claim 1, with funnel-shaped expansions of the capillary pores in both surfaces of the polymeric film.

3. [Currently amended] The flexible respiring polymeric film according to claim 1 with an organic structure, especially of polyethyleneterephthalate (PET), polyimide (PI) or polyamide (PA).

4. [Currently amended] The flexible respiring polymeric film according to claim 1 with silicate particles, noble metal particles, especially silver particles or particles of a metal from the iron group, especially nickel particles, or a mixture of particles as chemically inert inorganic nanoparticles for the binder layer.

5. [Currently amended] The flexible respiring polymeric film according to claim 1 with ceramic particles, especially titanium dioxide, or with a mixture of particles as photocatalytically active hydrophilic non-toxic metal nanoparticles for the lining layer.

6. [Currently amended] The flexible respiring polymeric film according to claim 1 with a mixture of nanoparticles for the binder layer and the lining layer.

7. [Currently amended] The flexible respiring polymeric film according to claim 1 with a further species of nanoparticles for satisfying further functions, especially anchoring functions, with the further nanoparticles, especially calcium hydroxy apatite or silver nanoparticles are integrated as additional layer in at least island-shaped structure or as a mixture into the other nanoparticles.

8. [Currently amended] The flexible respiring polymeric film according to claim 1 with a non-toxic color additive for coloring the polymeric film.

9. [Currently amended] The flexible respiring polymeric film according to claim 1 with a capillary diameter of the capillary pores in the range of 100 nm - 2 μm and a size of the nanoparticles in the range of 5 nm - 100 nm, with the size of the capillary and nanoparticle diameters being coordinated for maintaining the respiring function, and a thickness of the composite layer structure in the range below 500 nm.

10. [Currently amended] The flexible respiring polymeric film according to claim 1 with integrated sensors detecting the chemical and physical parameters of articles and spaces surrounding the polymeric film and with indicators displaying the parameters.

11. [Currently amended] The flexible respiring polymeric film according to claim 10 with an integrated micro-encapsulated oxygen storage depository.

12. [Currently amended] The flexible respiring polymeric film according to claim 11 with integrated actuators cooperating in control circuits with

the present sensors and storage depositories.

13. A method of producing a flexible respiring polymeric film with a spatially ordered structure of capillary pores of selectable diameter and funnel-shaped expansions in at least one surface for enabling the exchange of gas through the polymeric film and a composite layer structure of at least one transparent binder layer of chemically inert inorganic nanoparticles for protecting the polymeric film and at least one lining film adhering to the binder layer and made from hydrophilic non-toxic metal oxide nano-articles which under short wave light irradiation are photocatalytically active which are anti-bacterially and self-clean singly effective, with their effectiveness being adjustable by the selection of the opening angle of the funnel-shaped expansions of the capillary pores, especially in accordance with one of claims 1 to 12, with the cyclically repeatable method step maintainable under clean-room conditions:

Dip-coating step I: surface wetting of at least one surface of the porous polymeric film with a water-based dispersion of chemically inert inorganic nanoparticles in colloidal solution for forming the binder layer at normal pressure under atmospheric air and room temperature;

Sol-gel step I: moderate thermal treatment of the formed binder layer in a temperature range not detrimentally affecting the polymeric film for condensing the solution;

Rinsing step I: repeated rinsing of the hardened binder layer with distilled water for removing unbound nanoparticles;

Dip-coating step II: surface wetting of the surface of the porous polymeric film coated with the binder layer with a water-based dispersion of photocatalytically active hydrophilic non-toxic metal oxide

nanoparticles in colloidal solution for forming the lining layer at normal pressure in atmospheric air and room temperature;
Sol-gel step II: moderate thermal treatment of the formed lining layer in a temperature range not detrimentally affecting the polymeric film for condensing the solution;

Rinsing step II: repeated rinsing of the hardened lining layer with distilled water for removing unbound nanoparticles.

14. The method according to claim 13, with a treatment of both surfaces of the polymeric film used.

15. [Currently amended] The method according to claim 13 with a solution of the photocatalytically active hydrophilic non-toxic metal oxide nanoparticles in powder form in a colloidal dispersion with the chemically inert inorganic nanoparticles.

16. [Currently amended] The method according to claim 13 with a porous polymeric film of polyethyleneterephthalate (PET), polyimide (PI) or polyamide (PA), silicon dioxide powder as chemically inert inorganic nanoparticles and titanium dioxide as photocatalytically active hydrophilic non-toxic metal oxide nanoparticles.

17. [Currently amended] The method according to claim 13 with a controlled modification of the photocatalytically active hydrophilic non-toxic metal oxide nanoparticles by sufficiently lasting coating with a swelling layer, especially on the basis of an amino alkyl silane.

18. [Currently amended] The method according to claim 13 with method step preceding dip-coating step I or alternative thereto of applying a silver layer to the polymeric film.

19. [Currently amended] The method according to claim 18 with method step integrated or preceding the preceding or alternative method step of applying a silver layer on the polymeric film for applying further functional layers or parts thereof of nanoparticles.

20. The method according to claim 19 with a preceding method step for applying a layer with anchoring function with the used nanoparticles consisting preferably of calcium-hydroxy-apatite.

21. [Currently amended] The method step according to claim 13 with an integrated non-toxic dye additive for coloring the composite layer structure.

22. [Currently amended] The method according to claim 13 with a preparatory method step for forming the capillary pores in the polymeric film by high-energy irradiation with fission fragments or ions for generating chemically modified traces und subsequent non-technological surface treatment by etching of the irradiated polymeric film, with capillary pores with funnel-shaped expansions of differing opening angles being producible by varying the ration of the rates of trace etching and polymer etching.